

IN THE SPECIFICATION:

Please replace paragraph [0038] with the following amended paragraph:

[0038] The preferred organosilane and organosiloxane compounds are gases or liquids near room temperature and can be volatilized above about 10 Torr. Preferred organosilanes and organosiloxanes include:

methylsilane,	CH ₃ -SiH ₃
dimethylsilane,	(CH ₃) ₂ -SiH ₂
trimethylsilane,	(CH ₃) ₃ -SiH
disilanolmethane,	SiH ₃ -CH ₂ -SiH ₃
bis(methylsilano)methane,	CH ₃ -SiH ₂ -CH ₂ -SiH ₂ -CH ₃
1,2-disilanoethane,	SiH ₃ -CH ₂ -CH ₂ -SiH ₃
1,2-bis(methylsilano)ethane,	CH ₃ -SiH ₂ -CH ₂ -CH ₂ -SiH ₂ -CH ₃
2,2-disilanopropane,	SiH ₃ -C(CH ₃) ₂ -SiH ₃
1,3,5-trisilano-2,4,6-trimethylene,	-(-SiH ₂ CH ₂ -) ₃ - (cyclic)
1,3-dimethyldisiloxane,	CH ₃ -SiH ₂ -O-SiH ₂ -CH ₃
1,1,3,3-tetramethyldisiloxane,	(CH ₃) ₂ -SiH-O-SiH-(CH ₃) ₂
1,3-bis(silanomethylene)disiloxane,	(SiH ₃ -CH ₂ -SiH ₂ -) ₂ -O
bis(1-methyldisiloxanyl)methane,	(CH ₃ -SiH ₂ -O-SiH ₂ -) ₂ -CH ₂
2,2-bis(1-methyldisiloxanyl)propane,	(CH ₃ -SiH ₂ -O-SiH ₂ -) ₂ -C(CH ₃) ₂
1,3,5,7,9-pentamethylcyclopentasiloxane, and	-(-SiHCH ₃ -O-) ₅ - (cyclic)
1,3,5,7-tetrasilano-2,6-dioxy-4,8-dimethylene,	-(-SiH ₂ -CH ₂ -SiH ₂ -O-) ₂ - (cyclic)
1,3,5-trisilanetetrahydropyran,	-SiH ₂ -CH ₂ -SiH ₂ -CH ₂ -SiH ₂ -O- (cyclic)
2,5-disilanetetrahydrofuran,	-SiH ₂ -CH ₂ -CH ₂ -SiH ₂ -O- (cyclic)

and fluorinated carbon derivatives thereof, such as:

trifluoromethylsilane,	CF ₃ -SiH ₃
1,2-disilanotetrafluoroethane	SiH ₃ -CF ₂ -CF ₂ -SiH ₃

1,2-bis(trifluoromethylsilano)tetrafluoroethane, $CF_3\text{-SiH}_2\text{-CF}_2\text{-CF}_2\text{-SiH}_2\text{-CF}_3$
2,2-disilanohexafluoropropane, $SiH_3\text{-C}(\text{CF}_3)_2\text{-SiH}_3$
1,3-bis(silanodifluoromethylene)disiloxane, $(SiH_3\text{-CF}_2\text{-SiH}_2\text{-})_2\text{O}$
bis(1-trifluoromethylsiloxy)disiloxane
~~bis(1-trifluoromethylsiloxy)disiloxane~~, $(CF_3\text{-SiH}_2\text{-O-SiH}_2\text{-})_2\text{CF}_2$
1,3,5-trisilanetetrafluoropyran, and $\text{-SiH}_2\text{-CF}_2\text{-SiH}_2\text{-CF}_2\text{-SiH}_2\text{-O-}$ (cyclic)
2,5-disilanetetrafluorofuran. $\text{-SiH}_2\text{-CF}_2\text{-CF}_2\text{-SiH}_2\text{-O-}$ (cyclic)

Please replace paragraph [0046] with the following amended paragraph:

[0046] When susceptor 12 and the wafer are in processing position [[14]], they are surrounded by [[a]] an insulator 17 and process gases exhaust into a manifold 24. During processing, gases inlet to manifold 11 are uniformly distributed radially across the surface of the wafer. A vacuum pump 32 having a throttle valve controls the exhaust rate of gases from the chamber.

Please replace paragraph [0052] with the following amended paragraph:

[0052] The system controller 34 controls all of the activities of the CVD reactor and a preferred embodiment of the controller 34 includes a hard disk drive, a floppy disk drive, and a card rack. The card rack contains a single board computer (SBC), analog and digital input/output boards, interface boards and stepper motor controller boards. The system controller conforms to the Versa Modular Europeans (VME) standard which defines board, card cage, and connector dimensions and types. The VME standard also defines the bus structure having a 16-bit data ~~but~~ bus and 24-bit address bus.

Please replace paragraph [0055] with the following amended paragraph:

[0055] Fig. 4 shows an illustrative block diagram of the hierarchical control structure of the computer program 410. A user enters a process set number and process chamber number into a process selector subroutine 420 in response to menus or

screens displayed on the CRT monitor 40 by using the light pen 44 interface. The process sets are predetermined sets of process parameters necessary to carry out specified processes, and are identified by predefined set numbers. The process selector subroutine 420 ~~the then~~ (i) selects a desired process chamber on a cluster tool such as an Centura® platform (available from Applied Materials, Inc.), and (ii) selects a desired set of process parameters needed to operate the process chamber for performing the desired process. The process parameters for performing a specific process relate to process conditions such as, for example, process gas composition and flow rates, temperature, pressure, plasma conditions such as RF bias power levels and magnetic field power levels, cooling gas pressure, and chamber wall temperature and are provided to the user in the form of a recipe. The parameters specified by the recipe are entered utilizing the light pen/CRT monitor interface.

Please replace paragraph [0064] with the following amended paragraph:

[0064] The heater control subroutine 480 comprises program code for controlling the temperature of the heat modules or radiated heat that is used to heat the susceptor 12. The heater control subroutine 480 is also invoked by the chamber manager subroutine 440 and receives a target, or set point, temperature parameter. The heater control subroutine 480 measures the temperature by measuring voltage output of a thermocouple located in a susceptor 12, compares the measured temperature to the set point temperature, and increases or decreases current applied to the heat module to obtain the set point temperature. The temperature is obtained from the measured voltage by looking up the corresponding temperature in a stored conversion table, or by calculating the temperature using a fourth order polynomial. The heater control subroutine 480 gradually controls a ramp up/down of current applied to the heat module. The gradual ramp up/down increases the life and reliability of the heat module. Additionally, a built-in-fail-safe mode can be included to detect process safety compliance, and can shut down operation of the heat module if the reactor 10 is not properly set up.

Please replace paragraph [0071] with the following amended paragraph:

[0071] The oxidized organosilane or organosiloxane layer is then cured at a pressure less than about 10 Torr at a temperature from about 100°C to about 450°C ~~450~~ °C. Optionally, curing could be conducted after deposition of additional dielectric layers.

Please replace paragraph [0076] with the following amended paragraph:

[0076] Referring to Fig. 6D, after deposition of the gap filling layer 302, the reactor 10 optionally resumes deposition of the oxidized organosilane or organosiloxane layer of the present invention for deposition of a capping layer 312. Referring to Fig. 6E, after deposition of the capping layer, if any, the deposited layers are cured in a furnace or another chamber at a temperature from about 100°C to about 450°C ~~450~~ °C to drive off remaining solvent or water. Of course, processing conditions will vary according to the desired characteristics of the deposited films.

Please replace paragraph [0078] with the following amended paragraph:

[0078] Referring again to Fig. 7, the damascene structure alternatively includes the oxidized organosilane or ~~organsiloxane~~ organosiloxane as an intermetal dielectric. A first dielectric layer 510, preferably consisting of the oxidized organosilane or organosiloxane, is deposited on a substrate 512 and then a conventional silicon oxide, silicon nitride, or hydrogenated silicon carbide etch stop 514 is deposited on the first dielectric layer. The etch stop is then patterned to define the openings of the contacts/vias 516. A second dielectric layer 518, consisting of the oxidized organosilane or organosiloxane, is then deposited over the patterned etch stop and then patterned to define the interconnect lines 520. A single etch process is then performed to define the interconnects down to the etch stop and to etch the unprotected dielectric exposed by the patterned etch stop to define the contacts/vias.

Please replace paragraph [0080] with the following amended paragraph:

[0080] As shown in Fig. 8A, an initial first dielectric layer 510, such as parylene, FSG, silicon oxide, or the like, is deposited on the substrate 512 to a thickness of about 5,000 to about 10,000 \AA , depending on the size of the structure to be fabricated. As shown in Fig. 8B, the low k etch stop 514, which is the oxidized organosilane or organosiloxane layer, is then deposited on the first dielectric layer to a thickness of about 200 to about 1000 \AA using low levels of RF power. The low k etch stop 514 is then pattern etched to define the contact/via openings 516 and to expose first dielectric layer 510 in the areas where the contacts/vias are to be formed as shown in Fig. 8C. Preferably, low k etch stop 514 is pattern etched using conventional photolithography and etch processes using fluorine, carbon, and oxygen ions. After low k etch stop 514 has been etched to pattern the contacts/vias and the photo resist has been removed, a second dielectric layer 518 is deposited over etch stop 514 to a thickness of about 5,000 to about 10,000 \AA as shown in Fig. 8D. A second dielectric layer 518 is then patterned to define interconnect lines 520, preferably using conventional photolithography processes with a photo resist layer 522 as shown in Fig. 8E. The interconnects and contacts/vias are then etched using reactive ion etching or other anisotropic etching techniques to define the metallization structure (*i.e.*, the interconnect and contact/via) as shown in Figure 8F. Any photo resist or other material used to pattern the etch stop 514 or the second dielectric layer 518 is removed using an oxygen strip or other suitable process.

Please replace paragraph [0092] with the following amended paragraph:

[0092] An oxidized dimethylsilane film was deposited at a chamber pressure of 3.0 Torr and temperature of ~~15EC~~ 15°C from reactive gases which were flowed into the reactor as follows:

Dimethylsilane, $(\text{CH}_3)_2\text{SiH}_2$, at	55 sccm
Nitrous oxide, N_2O , at	300 sccm
Helium, He, at	4000 sccm.

Please replace paragraph [0095] with the following amended paragraph:

[0095] An oxidized 1,3,5-trisilano-2,4,6-trimethylene (cyclic) film is deposited at a chamber pressure of 3.0 Torr and temperature of ~~15EC~~ 15°C from reactive gases which flow into the reactor as follows:

1,3,5-trisilano-2,4,6-trimethylene, $-\text{-SiH}_2\text{CH}_2-\text{}_3-$ (cyclic), at	20 sccm
Nitrous oxide, N_2O , at	300 sccm
Helium, He, at	4000 sccm.

The substrate is positioned 600 mil from the gas distribution showerhead and 50 W of pulsed high frequency power (13 MHz) is applied to the showerhead for plasma enhanced deposition of an oxidized 1,3,5-trisilano-2,4,6-trimethylene layer.

Please replace paragraph [0096] with the following amended paragraph:

[0096] An oxidized 1,3-dimethyldisiloxane film is deposited at a chamber pressure of 3.0 Torr and temperature of ~~15EC~~ 15°C from reactive gases which are flowed into the reactor as follows:

1,3-Dimethyldisiloxane, $\text{CH}_3\text{-SiH}_2\text{-O-SiH}_2\text{-CH}_3$, at	30 sccm
Nitrous oxide, N_2O , at	300 sccm
Helium, He, at	4000 sccm.

The substrate is positioned 600 mil from the gas distribution showerhead and 50W of pulsed high frequency RF power (13 MHz) is applied to the showerhead for plasma enhanced deposition of an oxidized dimethyldisiloxane layer.

Please replace paragraph [0097] with the following amended paragraph:

[0097] An oxidized 1,3-dimethyldisiloxane film is deposited at a chamber pressure of 3.0 Torr and temperature of ~~15EC~~ 15°C from reactive gases which are flowed into the reactor as follows:

1,3-Dimethyldisiloxane, CH ₃ -SiH ₂ -O-SiH ₂ -CH ₃ , at	30 sccm
Nitrous oxide, N ₂ O, at	300 sccm
Helium, He, at	4000 sccm.

Prior to entering the chamber, the nitrous oxide is dissociated in a microwave applicator that provides 2000W of microwave energy. The substrate is positioned 600 mil from the gas distribution showerhead and 50W of high frequency RF power (13 MHz) is applied to the showerhead in cycles for plasma enhanced deposition of an oxidized dimethyldisiloxane layer. Each cycle provides RF power for 30% of the cycle.